

Sound Applications

Teacher Lesson Plan



Background Information

Sound is energy vibrating through substances. The energy can be transferred from one material to another. Sound must have a medium in which to travel. Our ears are amazing organs that change sound waves into electrical signals and then send them to our brains. Sound waves enter the ear canal and travel back to the eardrum. The eardrum is a thin layer of skin that is stretched tightly over the end of the ear canal, much like the skin of a drum, or the plastic over the metal can. The sound waves transfer energy to the eardrum, which begins to vibrate.

Sound gives organisms information about their environment. Sound is constantly occurring all around us. Sometimes, we don't even recognize that it is occurring until someone points it out.

Animals use sounds to survive in their habitats. Some animal ears are designed to collect very soft sounds such as the ears of an owl and the long ears of a rabbit. Prey and predator animals use it to flee dangerous situations and to locate food.

Content Standards

- Physical Science
 - Light and sound are forms of energy that behave in predictable ways.
- Life Science
 - Organisms perform a variety of roles in an ecosystem.

Student Activities

LESSON 1: Sound Bingo

Lesson Materials:

- Sound Bingo Card and outside area

Procedure:

- Students will recognize sounds in their environment using a Bingo Card to become more aware of sound/noise in their surroundings.
- Take students to an outdoor area around the school.

- Sit students in a large circle, (facing out). This activity can also be done on a “silent hike”.
- Students must not talk during this activity.
- Students should try and fill all the spots on the Bingo Card.
- Choose a time limit.
- Students can close their eyes to listen. They may notice more if not distracted by sight.
- Repeat in a different area. Try near a road, for example, to demonstrate how traffic noise can mask other sounds.

Student Discussion Questions:

- Did you notice any sounds that you normally don’t hear? *Answers will vary.*
- Did you hear any sounds that you couldn’t identify the source? *Answers will vary.*
- What was the loudest sound? What was the softest sound? *Answers will vary.*

LESSON 2: Sound Sit Spots

Lesson Materials:

- Sit Spot Sheet and outside area

Procedure:

- Walk to an area around your school.
- Find a location and sit for 5 minutes and recording all sounds that you hear.
- List whether the sounds are natural sounds (birds, etc.) or artificial (man-made – cars).
- Repeat in another location.

Student Discussion Questions:

- Compare the sounds produced by nature verses man made sounds? *Answers will vary.*
- Noise pollution is a problem in many cities. Would you consider it a problem where you did your sit spot? *Answers will vary*
- Can you describe a place or time where you consider it a problem? *It could be a problem where there is traffic, large cities, construction, large machinery, etc.*

LESSON 3: Soundscape Activity: Communicating in the Wild

Animals rely on sound for communication and survival. The purpose of this activity is to help students understand what wildlife may experience under unnatural noise conditions.

Lesson Materials:

- Computer with Speakers
- Audio clip of traffic

Procedure:

- Refer to the Soundscape Activity from the National Park Service found in your packet.

LESSON 4: Measuring Sound Around Your School:

Sound intensity is both a measure of loudness or amplitude and frequency. The human ear can pick up a range of frequencies which are different for each individual. In our daily lives, we are exposed to a wide range of sound intensities. Some sounds that have a greater decibel value can damage our hearing if the exposure is over a period of time. Some occupations require ear protection for the safety of the workers. Many municipalities have noise ordinances for the comfort and safety of their citizens.

Lesson Materials:

- Decibel Meter
- Sound Level Student Worksheet

Procedure:

1. Begin the activity by ringing a small bell until the class gives you their attention. The bell serves as a vehicle to engage students' interest in the activity.
2. Challenge the class to name different ways to make the bell sound louder. Students may suggest:
 - ringing the bell more vigorously so the clapper hits the side with more force
 - ringing the bell closer to their ears
 - cupping their hands around their ears to better focus the bell's sound waves into their ears
3. Introduce students to the Decibel Meter. Once it is powered on, readings may be immediately observed. Take three readings (below) in the classroom and record on the board. Discuss results.
 - a. Students are silent
 - b. Students are whispering
 - c. Students are talking in their normal voices
4. Using the decibel meter, have students record sound intensity in 10 different areas of the school. Be sure to include larger rooms such as the gymnasium and cafeteria. Measure sound levels when spaces contain students and are empty. Have students complete the student worksheet chart and questions.
5. As a group, discuss the Decibel Chart. Discuss why sound may cause hearing damage.